Preferred Dates: July 31st - Aug. 4th

Class name: The Train Project
Description: Inventor Skills
Age Group: Grades 6 - 8

Resources Needed:

- Venue
- Computers
    - with Autodesk Inventor installed
- Folders
- Sketches of train parts for students to build from
    - (I can make those)
- Projector
    - for ease of lesson explanations and demonstrations?
- Fruit Snacks + granola bars, etc.

Lesson Plans
Class time: 9:00 am to 3:00 pm

Day	Plan
1	➢ 9:15 - Icebreaker/Personal Introduction ➢ 9:45 - Intro to Inventor Geometric Constraints ○ Explain how to create sketch geometry in Inventor and the types of constraints that can be applied within it: geometric constraints, dimension constraints, and assembly constraints ■ Sketch Tab > Constrain Panel ○ Use videos that demonstrate geometric constraints and have the students try to emulate/ replicate that behavior in a sketch by applying the appropriate constraints Ex: ○ https://nv.instructuremedia.com/fetch/QkFoYkIxc0hhUU5WekY4d2JDc0hCYThlV1E9PS0tYTNjZDVkYWM3ZTFlYjMwOWMzNmE0MWVkOTQxYTYyMTU1NTdhMDNjZA.mp4 ➢ 10:45 - Go over the answers and have students write down each constraint function they discovered and how they work. ○ Coincident Constraint ○ Collinear Constraint ○ Concentric Constraint ○ Fixed Constraint

	○ Parallel constraint ○ Perpendicular Constraint ○ Horizontal/Vertical Constraint ○ Tangent ○ Symmetric ○ Equal ➢ 11:00 - Explain other basic Inventor functions and tools ○ Dimensioning ○ Extrusions ○ Work planes ○ Revolve tool ○ Mirroring ○ Patterns ○ Holes ➢ 11:30 - Lunch break ➢ 12:10 - Let students explore Inventor and challenge them to build a part in Inventor off a sketch ➢ 1:30 - Snack Break ➢ 1:45 - Demonstrate how to build the part ○ Explain how to save project files etc. ➢ 3:00 - Parents arrive
2	➢ 9:15 - Introduce train project ○ Show example of a completed train project portfolio ■ With dimensioned drawings and assembly page with numbered balloons/parts list ○ Hand out drawings of each part they will be making with the dimensions for them to build off of ➢ 9:45 - Explain how to interpret drawings and find the dimensions they need ○ How to read dimensions for holes, radii, etc. ○ Demonstrate with axle peg or one of the simplest pieces and have kids follow along ➢ 10:30 - Work time in Inventor ○ Have them start in order of easiest to hardest pieces ➢ 11:30 - Lunch break ➢ 12:10 - Continue to work ➢ 1:30 - Snack break ➢ 3:00 - Parents arrive ○ Make sure students have saved their work and named their file folders
3	➢ 9:15 - Continue work time ➢ 11:30 - Lunch break ➢ 12:10 - Continue work time ➢ 1:30 - Snack break and outside game activity (so they don't just sit on the

	computer having work time for the whole day) ➢ 2:00 - Work time ➢ 3:00- Parents arrive ○ Students must save their work on their computers
4	➢ 9:15 - Introduction to dimensioned drawings ○ Show kids how to make drawings in Inventor for each part ○ Demonstration with the easy piece from the walkthrough on day 3 ➢ 10:00 - Let the children loose to finish any parts and work on their dimensioned drawings ➢ 11:30 - Lunch break ➢ 12:10 - Introduction to parts assembly ○ Explain assembly constraints ➢ 12:45 - Work time ○ Kids should be finished with ALL parts at this point and work on their drawings or assembly ➢ 1:45 - Snack break ➢ 2:00 - Work time continued ➢ 3:00 - Parents arrive ○ Students must save their work or RIP
5	➢ 9:15 - Show students how to create an exploded assembly page with numbered balloons and parts list ➢ 9:45 - Work time to finish drawings, assembly, and assembly page ➢ 11:30 - Lunch time ➢ 12:10 - Students start to finish and print their drawings and assembly pages (hopefully) ○ For early finishers, challenge them to create a track piece for their train and create an animation in Inventor ➢ 1:30 - Rocket pops or some kind of ice cream treat? ➢ 2:00 - Students assemble their drawings and assembly page in a folder portfolio ➢ 3:00 - Parents arrive and students take home their train projects

(If we added a week, maybe we could teach them how to 3D Print their pieces??)